ATMOSPHERIC SCIENCE DATA CENTER STATUS

Jonathan Gleason

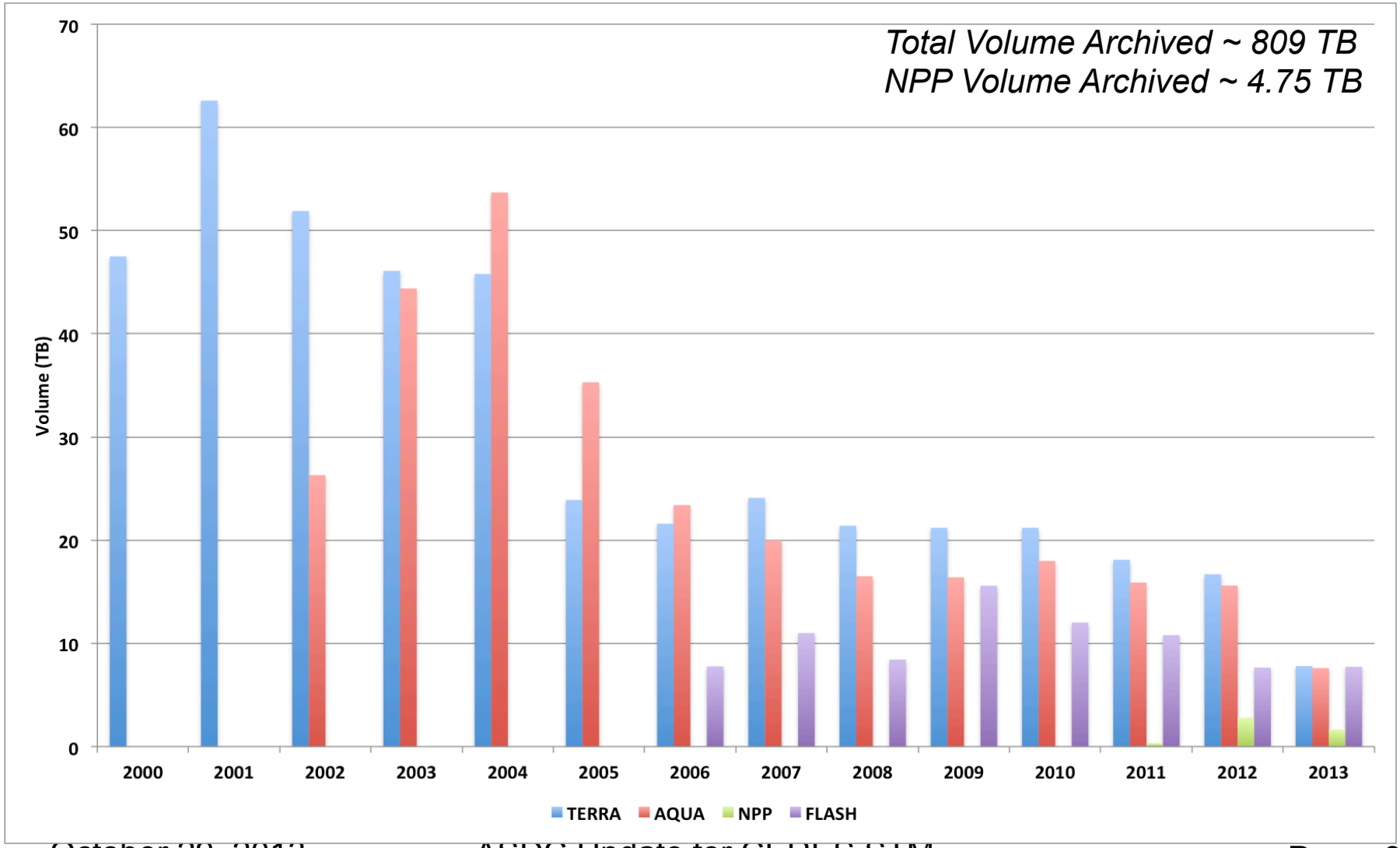
ASDC

CERES Science Team Meeting
Oct 29, 2013

CERES USER METRICS

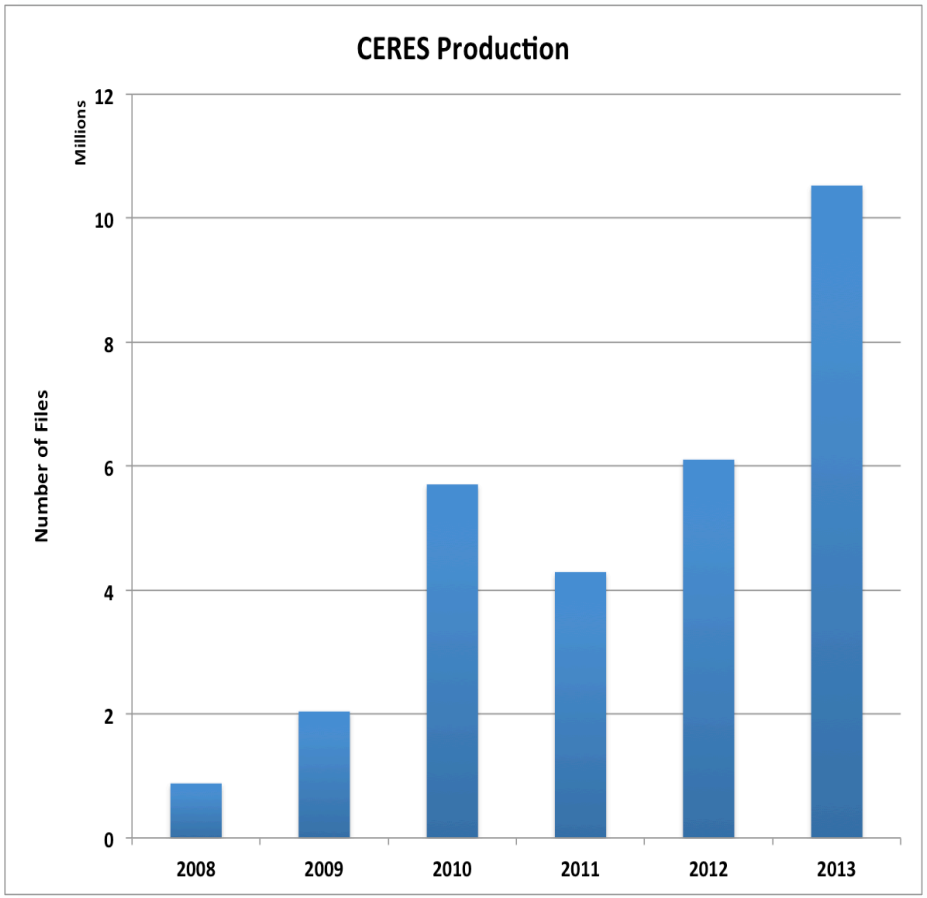
CERES and FLASHFlux Archive Volume

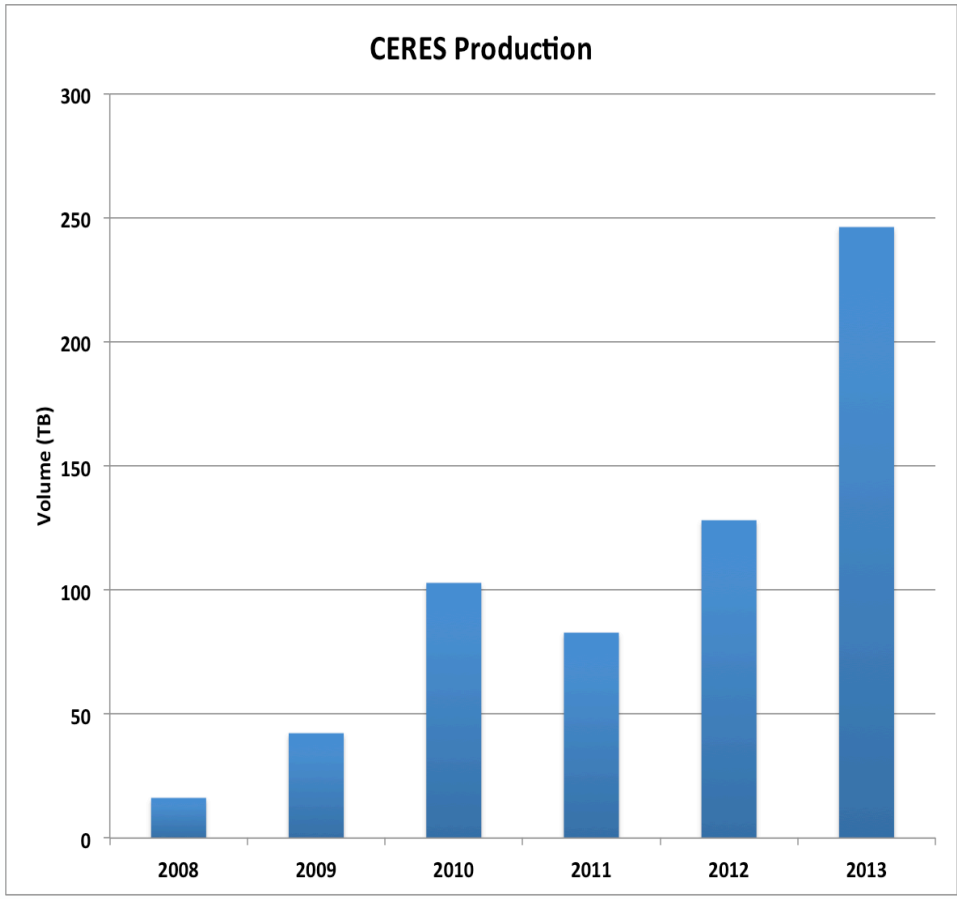
By Data Date Through September 2013



CERES Ancillary Data Archived

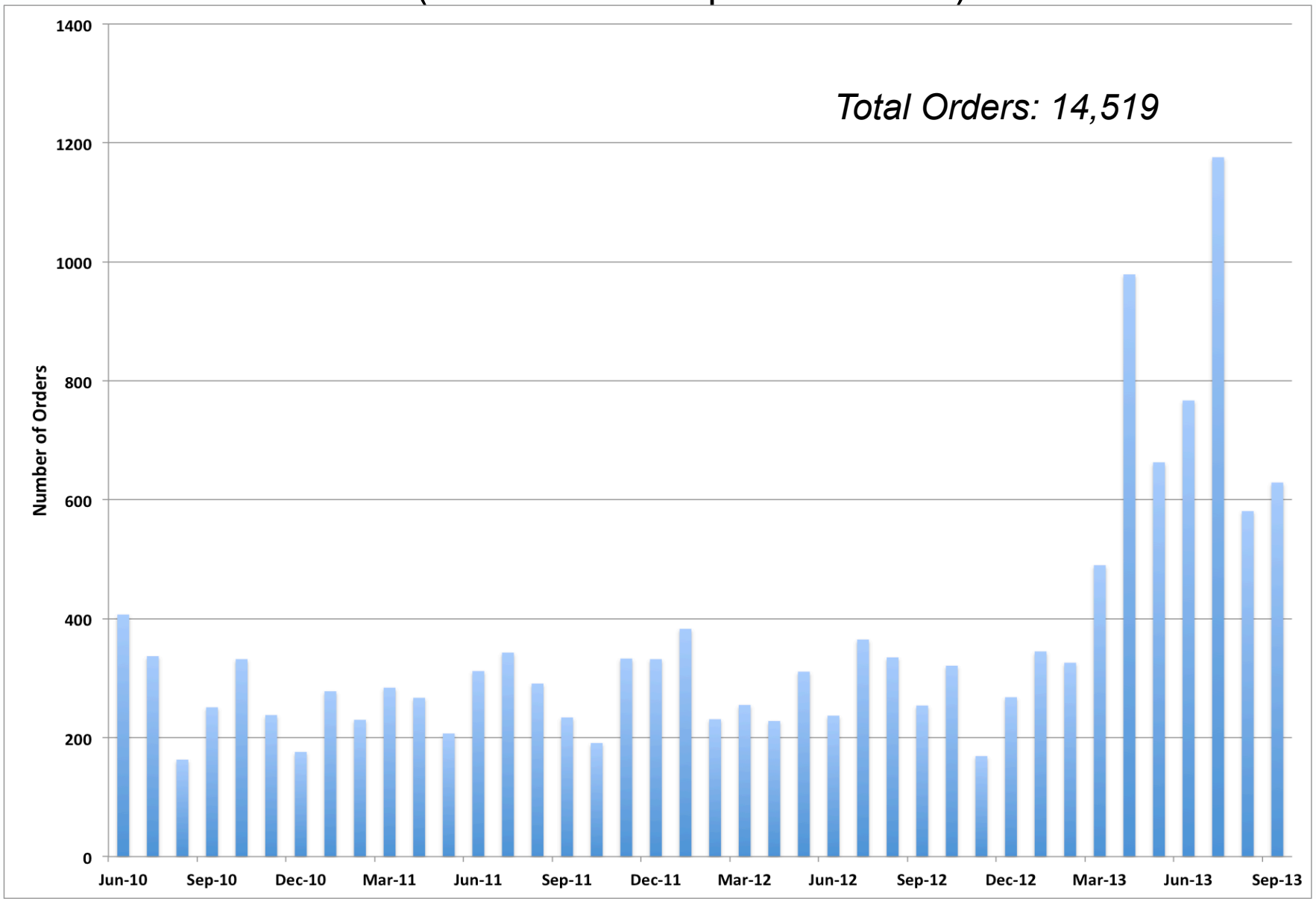
(September 2008 – September 2013)





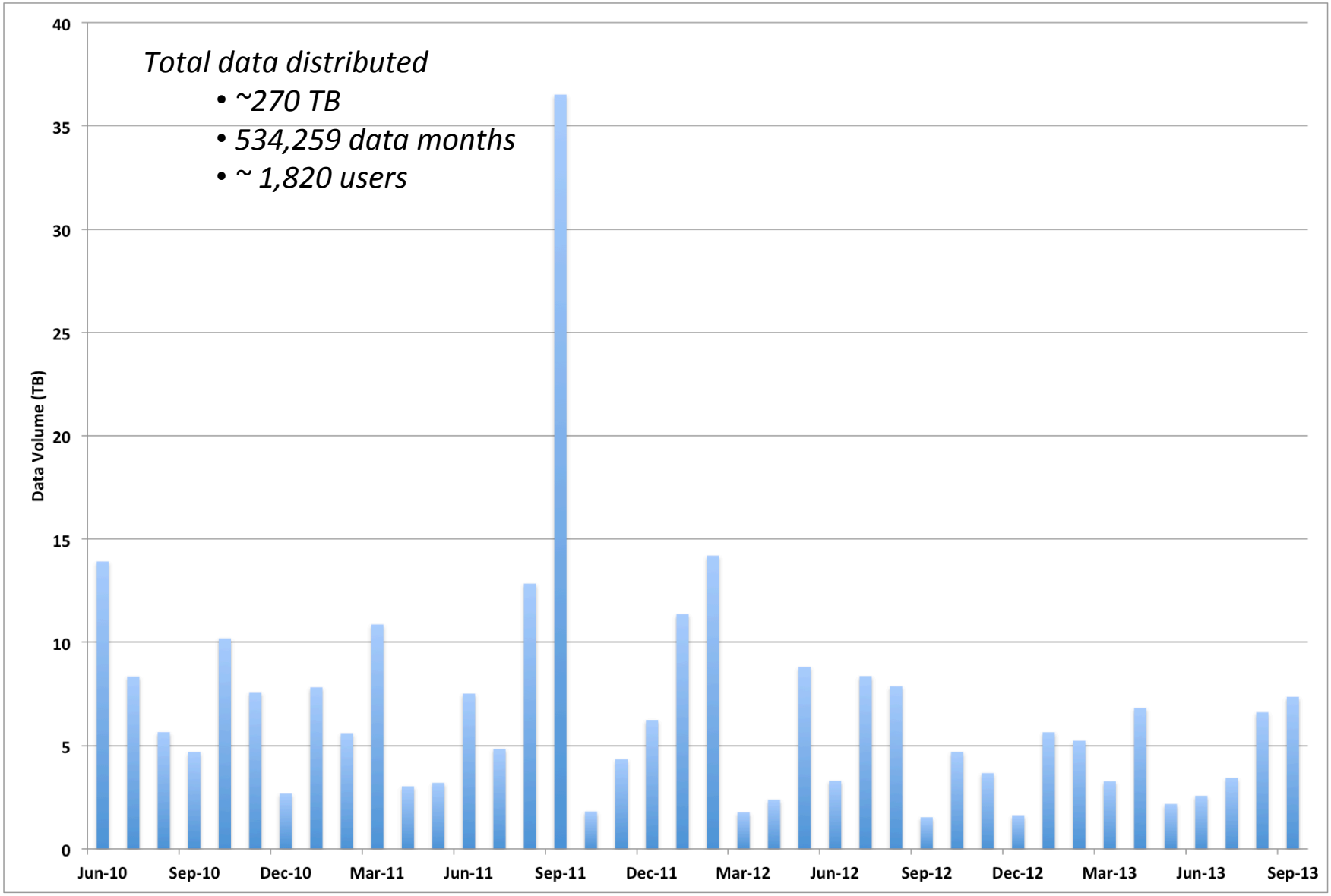
CERES Data Orders

(June 2010 – September 2013)



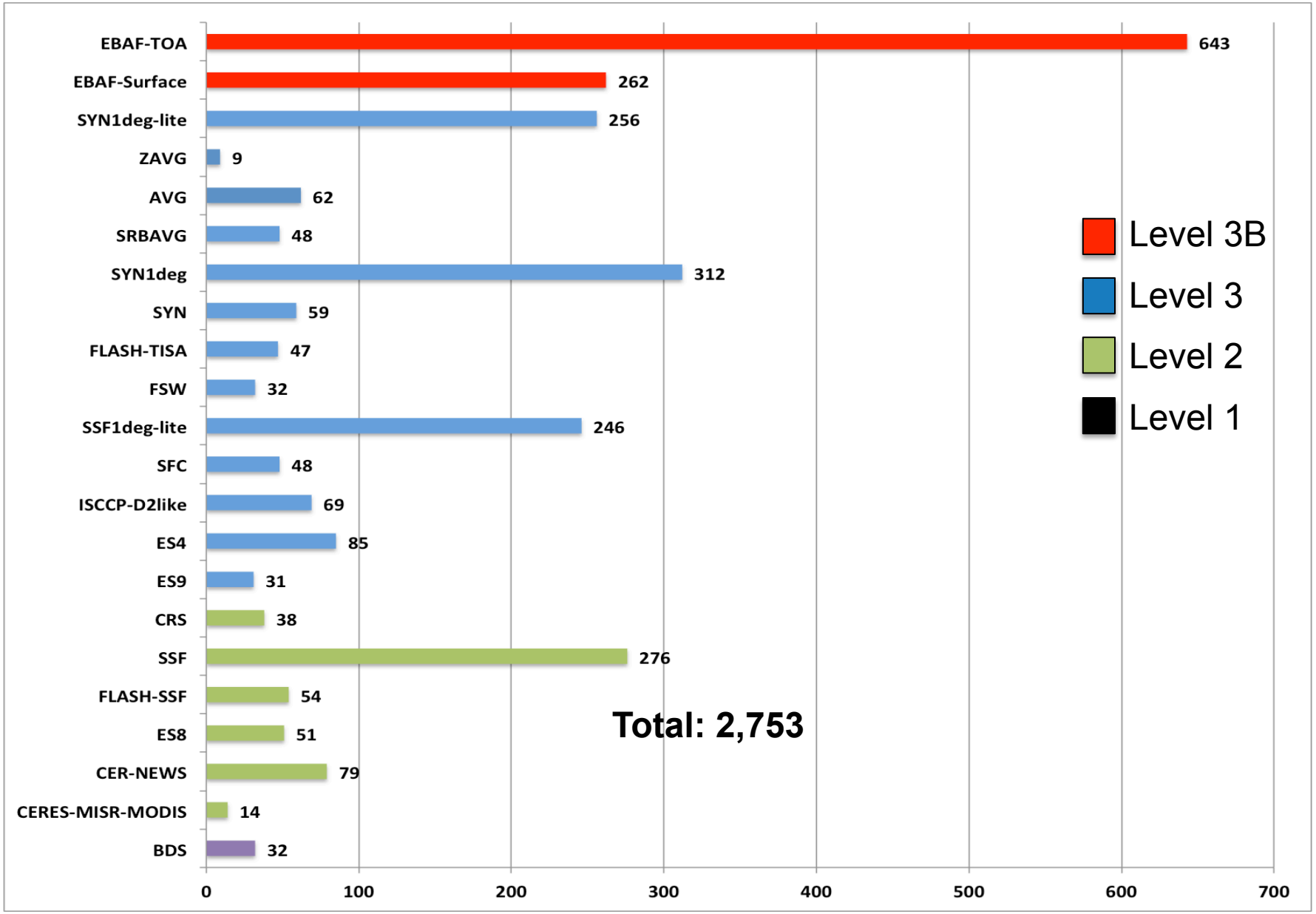
CERES Data Distribution

(June 2010 – September 2013)

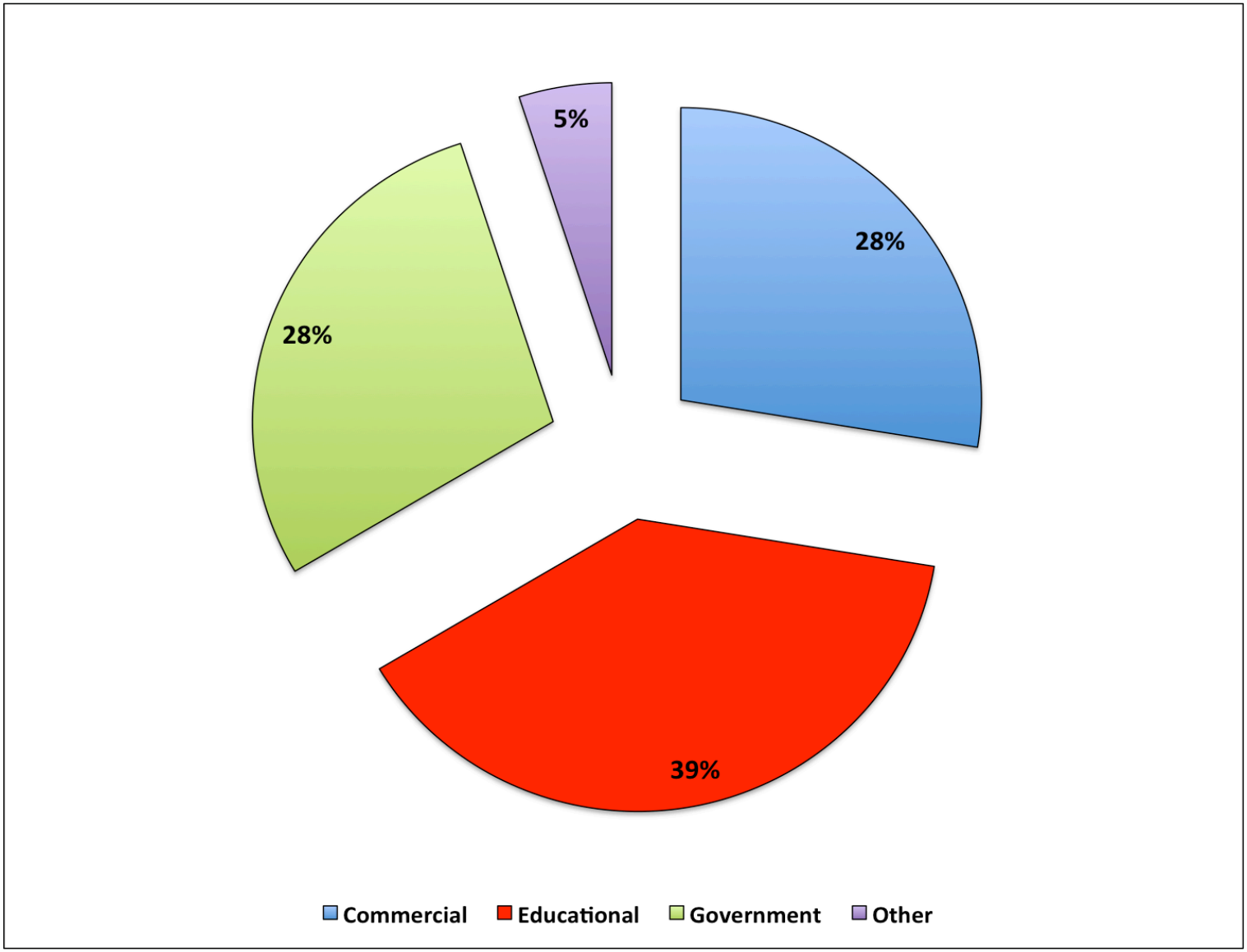


Number of Users by Product

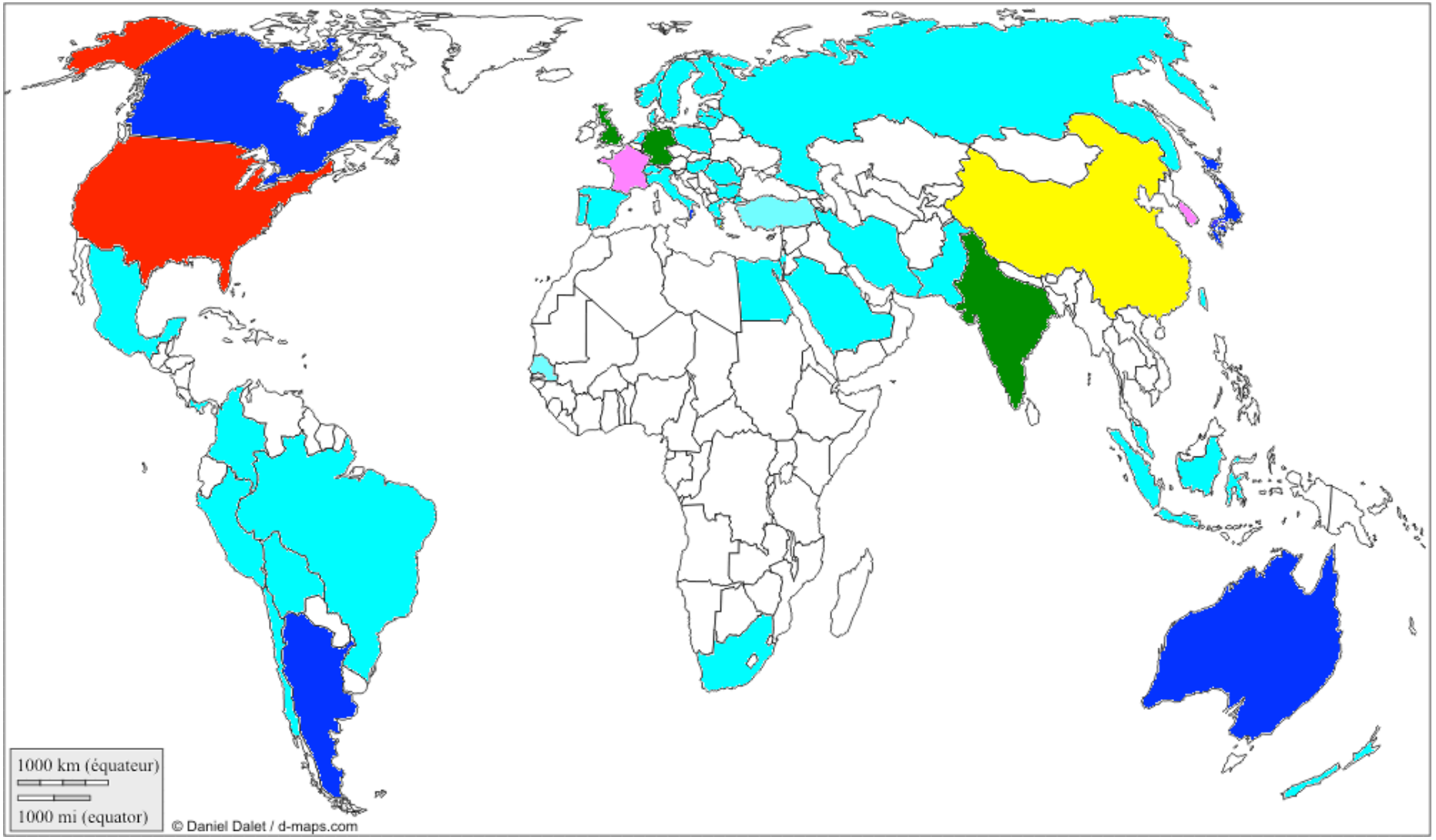
(June 2010 – September 2013)



User Affiliations



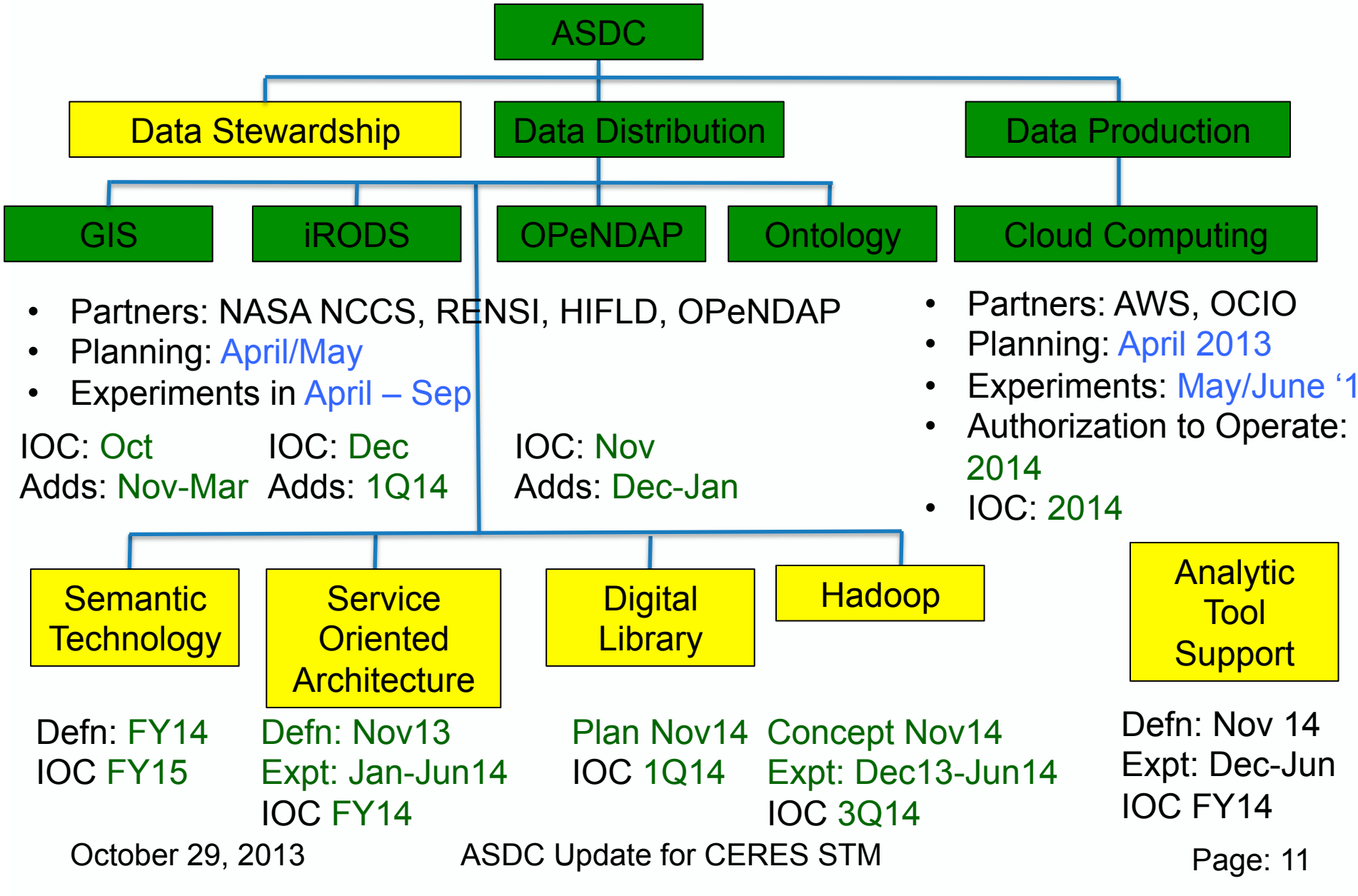
Users by Country (June 2010 – September 2013)



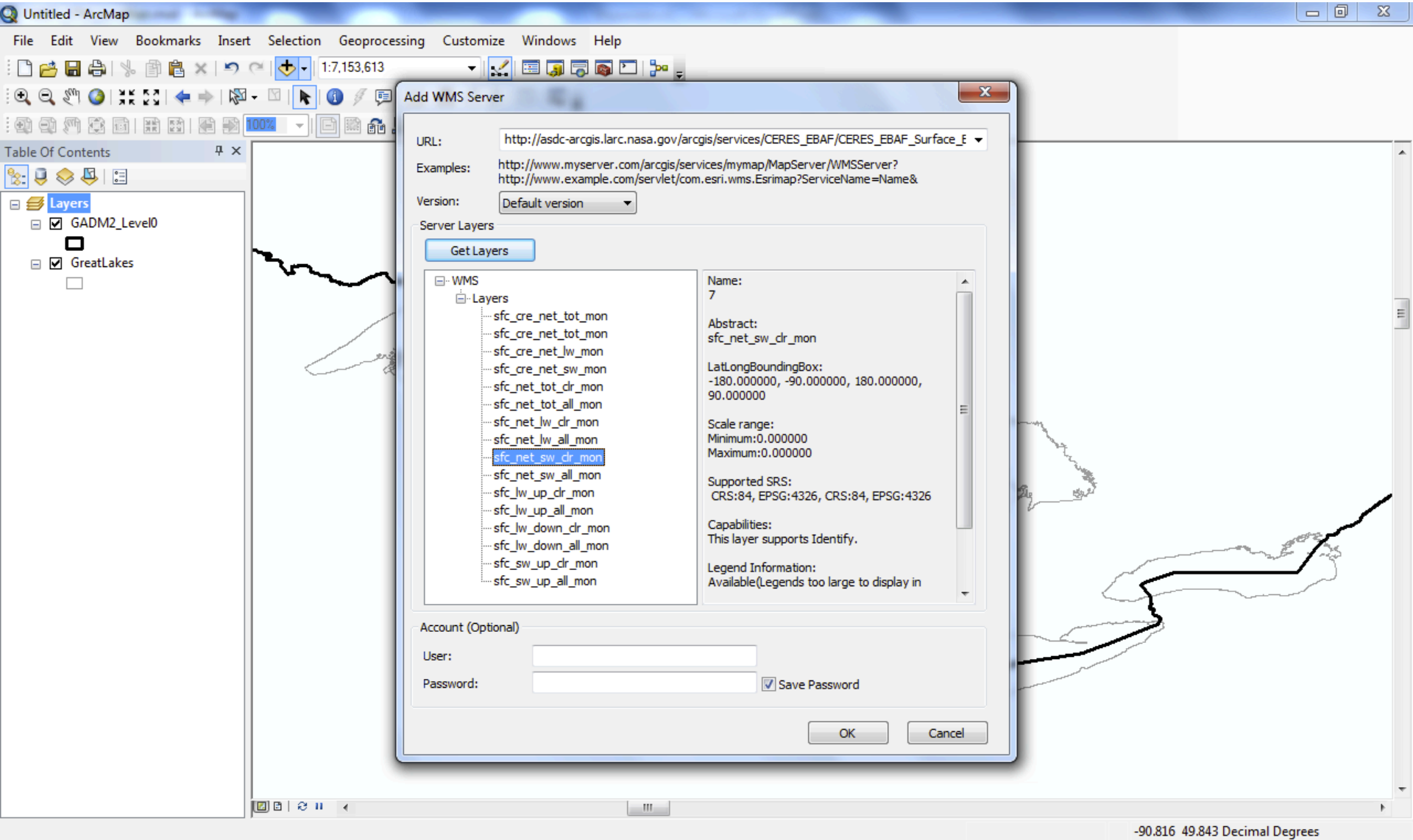
1-10 11-25 26-35 30-40 115 >500

PLANNED DATA ACCESS IMPROVEMENTS

ASDC Areas of Modernization

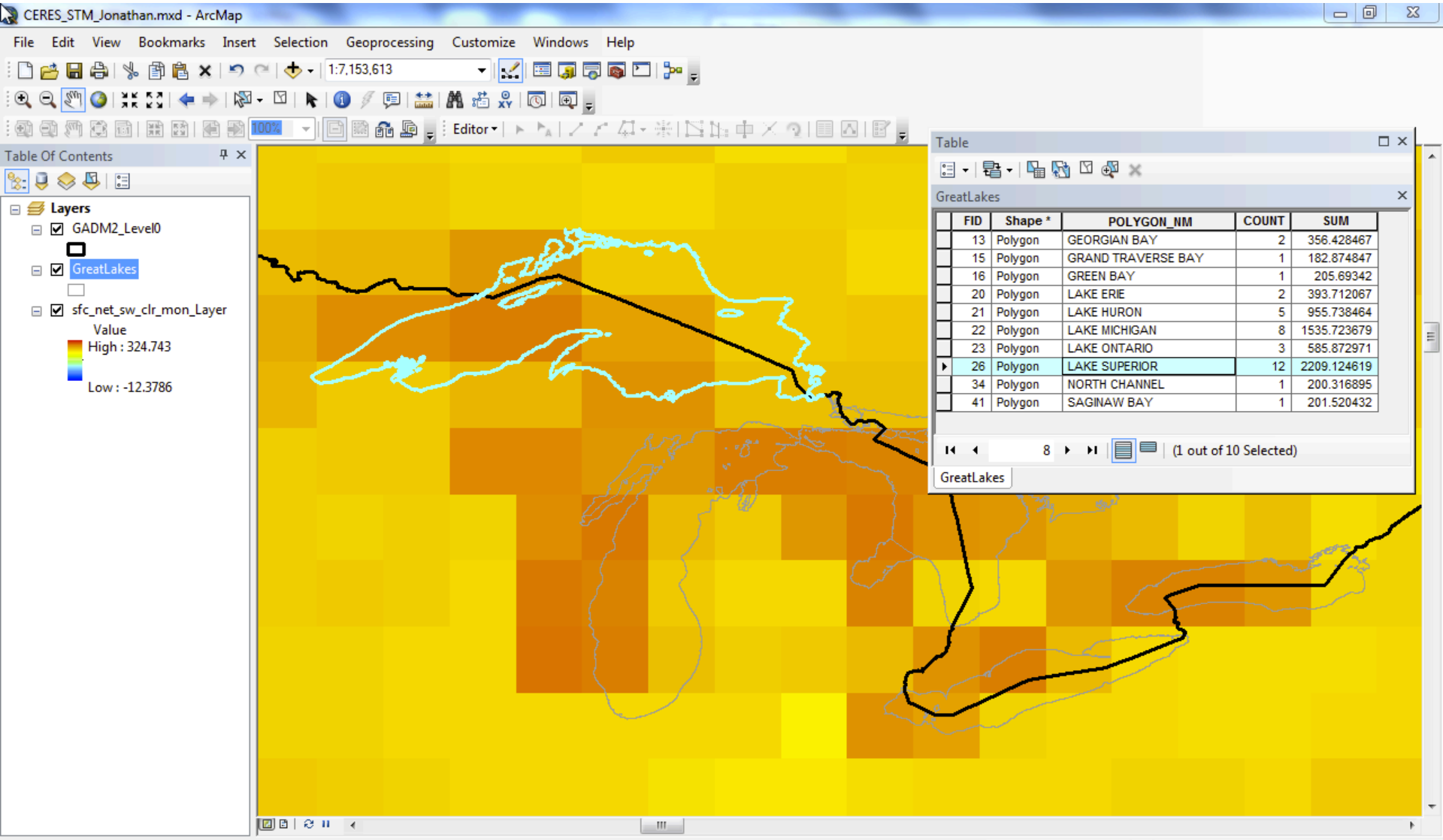


GIS Initial Capability – Using ArcGIS software and EBAF Surface Data



Possible GIS Use Case

CERES Surface Flux with Freshwater Lakes



LaRC Cloud Computing Scenarios

ASDC Data Product Re-processing

- Current approach: Buy extra hardware
- Bursty behavior
- High Data Throughput

Foreign National short-term Visitors and remote partners

- Current approach: NIA or company provisioning and Duplicate Data
- Irregular visitors, local hardware is often inadequate
- Permit their sponsor to buy time Public Cloud without NASA participation
  - Permit NASA funded option depending on agreement with sponsor
- NASA makes public data available to their cloud instance
- Continue collaboration on non-NASA assets after they return home

ASDC EOSWEB RE-DESIGN EFFORT

eosweb.larc.nasa.gov

EOSWEB Re-design Effort

ASDC deployed new website April 8, 2013

Goal

- Enhance user experience for data discovery, ordering and external site access
- Improve sustainability for ASDC staff and science content providers. Drupal 7 Content Management System provides modularity and maintainability.

Stakeholder Input

- Incorporate features & best practices from ESDIS & other NASA DAACS
- ASDC User Working Group and CERES team engaged to provide input
- Project teams solicited and feedback successfully incorporated
- New design addresses findings from ESDIS GIBS study

EOSWEB Re-design Effort

Status

- Ongoing effort to incorporate enhancements to website
- Significant interaction with CERES team (Doelling, P. Mlynczak, Loeb) since initial deployment to tailor data informational pages
- October 25th, 2013 deployment incorporates CERES updates

CERES Updates

- CERES data info pages reflect 4 tier design
  - Tier 1 – Level (1, 2, 3, 3b)
  - Tier 2 – Processing Stream Name
  - Tier 3 – Product Name
  - Tier 4 – Filename

October 25th CERES Updates

- Combined overlapping Terra/Aqua datasets into one webpage per stream (SYN1deg, ISCCP-D2-like, CRS)
- Updated temporal coverage to list date ranges per platform and per instrument for combined dataset
- Added Instrument and Platform fields for merged data products
- Added “Current Products” and “Legacy Versions” links were relevant
- Reorganize ES4/9 product pages to separate Edition3 from Ed1-CV and organize by platform
- Added capability to list product specific notes
- Added netCDF label to subset/visualization tool links
- Added ES4/9 links to NPP Data Products Page
- Implemented misc. corrections per feedback from CERES team

EOSWEB Re-design Effort

Tier 1 – Level
Each level contains streams

CERES Data and Information

The Clouds and the Earth's Radiant Energy System (CERES) is a key component of the Earth Observing System (EOS) program. The CERES instruments provide radiometric measurements of the Earth's atmosphere from three broadband channels. The CERES missions are a follow-on to the successful Earth Radiation Budget Experiment (ERBE) mission. The first CERES instrument (PFM) was launched on November 27, 1997 as part of the Tropical Rainfall Measuring Mission (TRMM). Two CERES instruments (FM1 and FM2) were launched into polar orbit on board the EOS flagship Terra on December 18, 1999. Two additional CERES instruments (FM3 and FM4) were launched on board EOS Aqua on May 4, 2002. The newest CERES instrument (FM5) was launched on board the Suomi National Polar-orbiting Partnership (NPP) satellite on October 28, 2011.

Level 3B | Level 3 | Level 2 | Level 1B | Documentation

- Level 3 Description
- SYN1deg - CERES temporally interpolated TOA fluxes (GEO-enhanced), MODIS and GEO clouds, and computed TOA/surface/profile fluxes
- SSF1deg - CERES temporally interpolated TOA fluxes (constant meteorology) and MODIS clouds.
- ISCCP-D2like - CERES-MODIS and GEO cloud properties stratified by ISCCP cloud types.
- FLASHFlux - Near real-time CERES observed TOA fluxes, MODIS clouds, and parameterized surface fluxes, not officially calibrated.
- ERBElike - CERES instrument TOA fluxes using algorithms identical to those used by ERBE.

EOSWEB Re-design Effort

Tier 2 – Stream
Each stream contains data products. Products organized by temporal and spatial resolution vs by filenames

SYN1deg - CERES temporally interpolated TOA fluxes (GEO-enhanced), MODIS and GEO clouds, and computed TOA/surface/profile fluxes

Current Products

Description: CERES temporally interpolated TOA fluxes (GEO-enhanced), MODIS and GEO clouds, and computed TOA/surface/profile fluxes.

Products	Temporal Resolution	Spatial Resolution	Temporal Coverage
SYN1deg-Month Ed3A	Monthly	Regional, Zonal, Global	Terra: 03/2000 - 06/2002 Terra+Aqua: 07/2002 - 03/2013
SYN1deg-Day Ed3A	Daily	Regional	03/2000 - 03/2012
SYN1deg-M3Hour Ed3A	Monthly 3-Hourly	Regional, Zonal, Global	Terra: 03/2000 - 06/2002 Terra+Aqua: 07/2002 - 03/2013
SYN1deg-3Hour Ed3A	3 Hourly	Regional, Zonal, Global	Terra: 03/2000 - 06/2002 Terra+Aqua: 07/2002 - 03/2013

Legacy Versions

Legacy versions listed by filename

EOSWEB Re-design Effort

Tier 3 – Data Product
Each product contains detailed product info

SYN1deg-Month Ed3A

Project Title:	CERES
Discipline:	Clouds Radiation Budget
Version:	Edition 3A
Level:	L3
Platform:	Terra, Aqua
Spatial Coverage:	(-90, 90)(-180,180)
Spatial Resolution:	Regional, Zonal, Global
Temporal Coverage:	Terra: 03/2000 - 06/2002 Terra+Aqua: 07/2002 - 03/2013
Temporal Resolution:	Monthly
File Format:	HDF

Reverb: **Order Data**

Subset/Visualization Tool: CERES Order Tool (netCDF)

Quality Summary: SYN1deg Ed3A Quality Summary

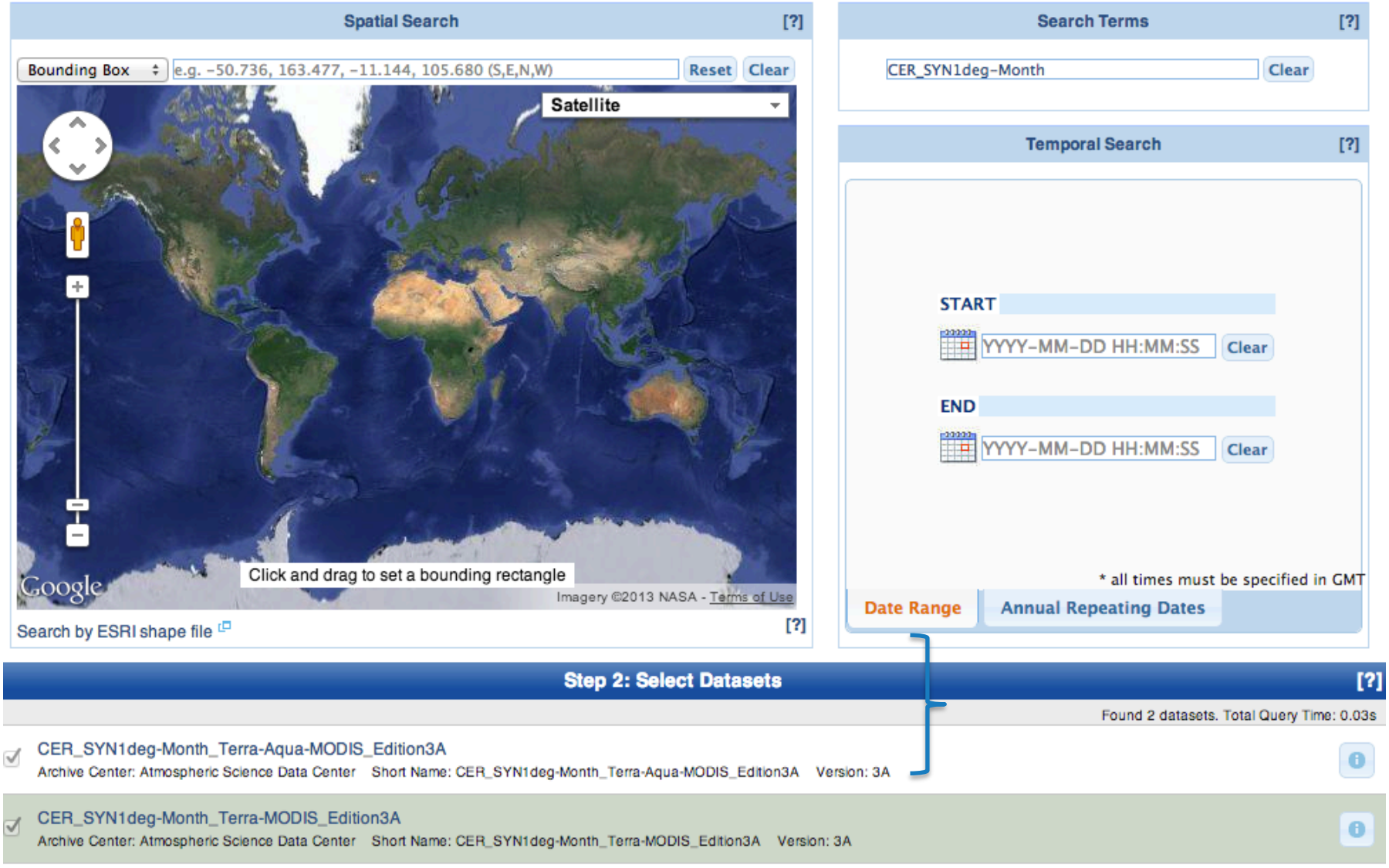
Temporal coverage shows both ranges in merged dataset

Browse Images | **Parameters** | **Order Data** | **Read Software** | **Documentation**

CERES Browse Imagery

Shorter terms used to describe products vs detailed filename

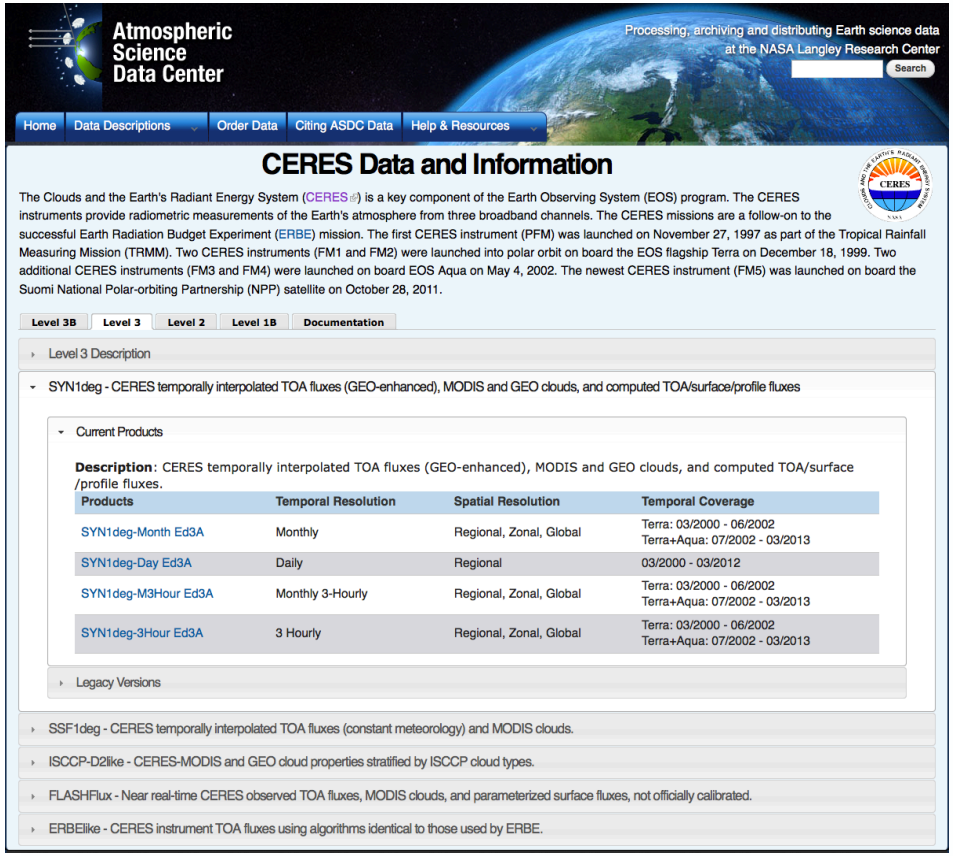
Tier 4 – Filenames
Order Files From REVERB Website (Outside EOSWEB)



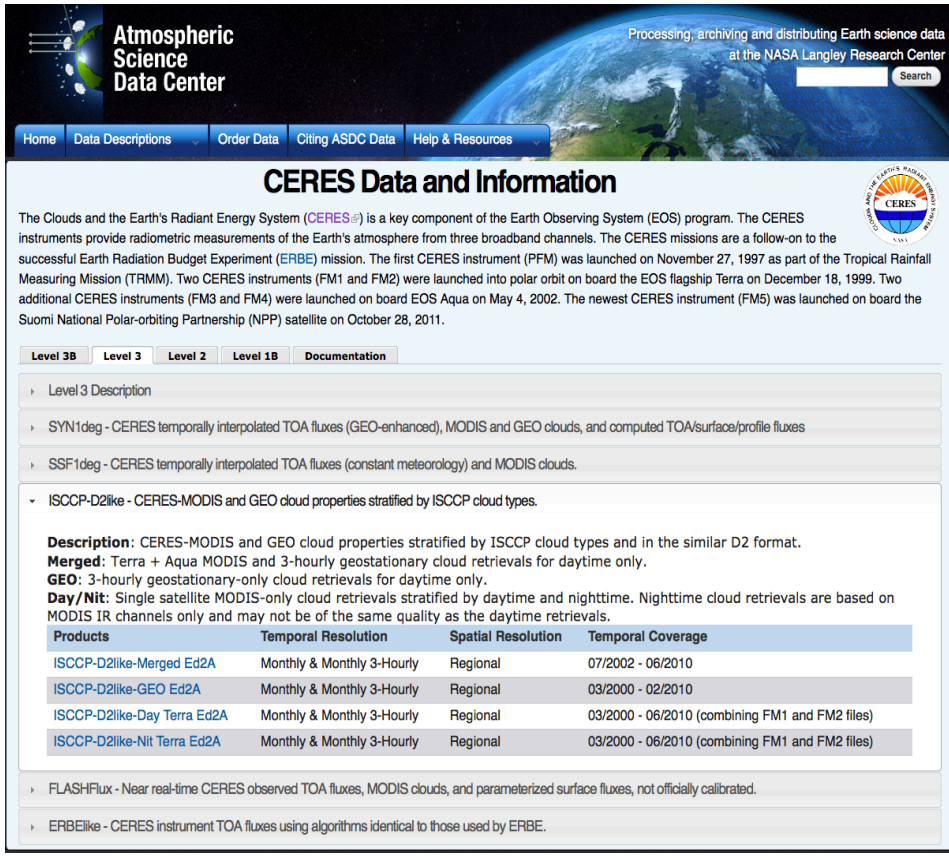
Both filename types (Terra and Terra+Aqua) appear in search

EOSWEB Updates

Overlapping Terra & Aqua datasets combined for display at stream level



SYN1deg



ISCCP-D2Like

http://eosweb.larc.nasa.gov

EOSWEB Updates

Added platform (L3) and instrument (L2 & L3) fields for merged product-level pages

SSF Aqua-FM3 Ed3A

Project Title:	CERES
Discipline:	Clouds Radiation Budget
Version:	Edition 3A
Level:	L2
Platform:	Aqua
Instrument:	FM3
Spatial Coverage:	(-90, 90)(-180,180)
Spatial Resolution:	Footprint
Temporal Coverage:	07/02/2002 - 04/30/2013
Temporal Resolution:	Instantaneous
File Format:	HDF

Reverb: **Order Data**

Subset/Visualization Tool: CERES Order Tool (netCDF)

Quality Summary: Aqua Edition3A Quality Summary

Browse Images | **Parameters** | **Order Data** | **Read Software** | **Documentation**

CERES Browse Imagery

SYN1deg-3Hour Ed3A

Project Title:	CERES
Discipline:	Clouds Radiation Budget
Version:	Edition 3A
Level:	L3
Platform:	Terra, Aqua
Spatial Coverage:	(-90, 90)(-180,180)
Spatial Resolution:	Regional, Zonal, Global
Temporal Coverage:	Terra: 03/2000 - 06/2002 Terra+Aqua: 07/2002 - 03/2013
Temporal Resolution:	3 Hourly
File Format:	HDF

Reverb: **Order Data**

Subset/Visualization Tool: CERES Order Tool (netCDF)

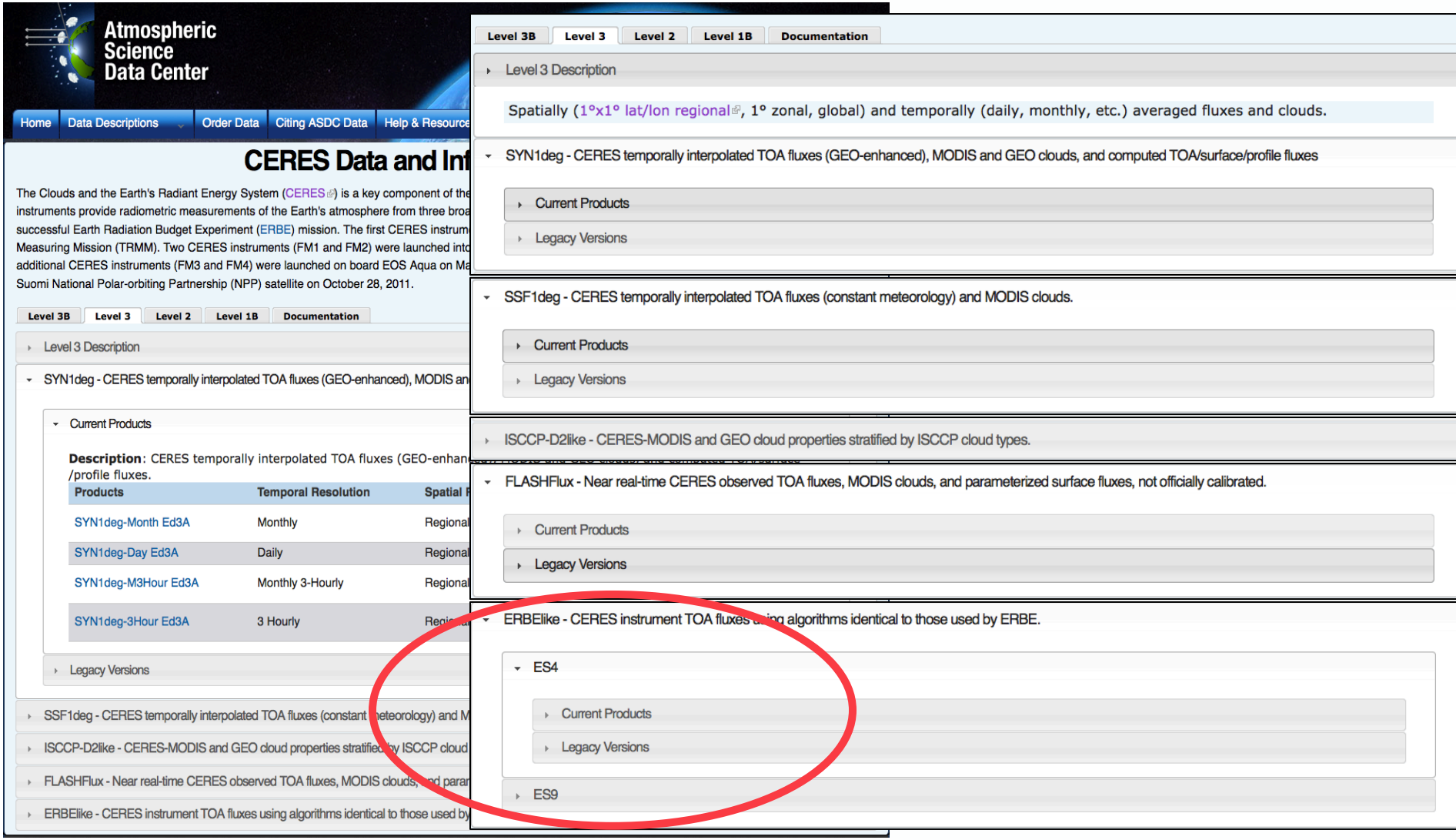
Quality Summary: SYN1deg Ed3A Quality Summary

Browse Images | **Parameters** | **Order Data** | **Read Software** | **Documentation**

CERES Browse Imagery

EOSWEB Updates

Added “Current Products” and “Legacy Versions” links



EOSWEB Updates

ES4 & ES9 pages separate Ed3 and Cal/Val products

Level 3B | Level 3 | Level 2 | Level 1B | Documentation

▸ Level 3 Description

Spatially (1°x1° lat/lon regional, 1° zonal, global) and temporally (daily, monthly, etc.) averaged fluxes and clouds.

▸ SYN1deg - CERES temporally interpolated TOA fluxes (GEO-enhanced), MODIS and GEO clouds, and computed TOA/surface/profile fluxes

▸ SSF1deg - CERES temporally interpolated TOA fluxes (constant meteorology) and MODIS clouds.

▸ ISCCP-D2like - CERES-MODIS and GEO cloud properties stratified by ISCCP cloud types.

▸ FLASHFlux - Near real-time CERES observed TOA fluxes, MODIS clouds, and parameterized surface fluxes, not officially calibrated.

▾ ERBElike - CERES instrument TOA fluxes using algorithms identical to those used by ERBE.

▾ ES4

▾ Current Products

Description: ERBElike Monthly Geographic Averages (ES-4): CERES instrument TOA fluxes using algorithms identical to those used by ERBE, averaged regionally (2.5°, 5°, and 10° grid), zonally (2.5°, 5°, and 10°) and globally.
Note: The latest CERES data products (Edition3 for Terra and Aqua; Edition2 for TRMM) are approved for science publications.

Products	Temporal Resolution	Spatial Resolution	Temporal Coverage
ES4 Aqua-Xtrk Ed3	Monthly, Daily, Monthly Hourly	Regional, Zonal, Global	07/2002 - 03/2013
ES4 Terra-Xtrk Ed3	Monthly, Daily, Monthly Hourly	Regional, Zonal, Global	03/2000 - 03/2013
ES4 TRMM-PFM Ed2	Monthly, Daily, Monthly Hourly	Regional, Zonal, Global	01/1998 - 03/2000

Note: Edition1-CV is for instrument validation purposes only and not suited for science publications.

Products	Temporal Resolution	Spatial Resolution	Temporal Coverage
ES4 Aqua-FM3 Ed1-CV	Monthly, Daily, Monthly Hourly	Regional, Zonal, Global	07/2002 - 09/2013
ES4 Aqua-FM4 Ed1-CV	Monthly, Daily, Monthly Hourly	Regional, Zonal, Global	06/2002 - 03/2005
ES4 NPP-FM5 Ed1-CV	Monthly, Daily, Monthly Hourly	Regional, Zonal, Global	02/2012 - 09/2013
ES4 Terra-FM1 Ed1-CV	Monthly, Daily, Monthly Hourly	Regional, Zonal, Global	03/2000 - 09/2013
ES4 Terra-FM2 Ed1-CV	Monthly, Daily, Monthly Hourly	Regional, Zonal, Global	03/2000 - 09/2013

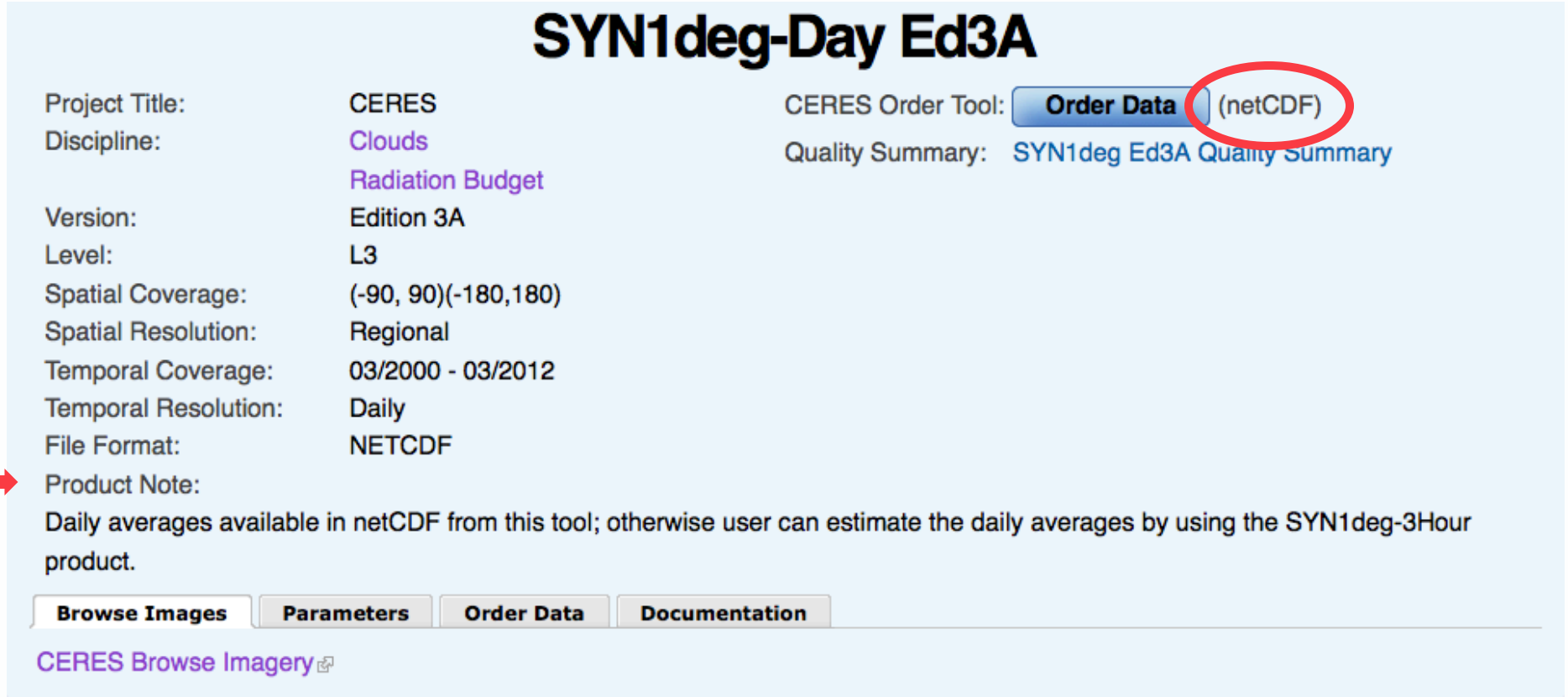
▸ Legacy Versions

▸ ES9

Products split by Ed3 and Ed1-CV

EOSWEB Updates

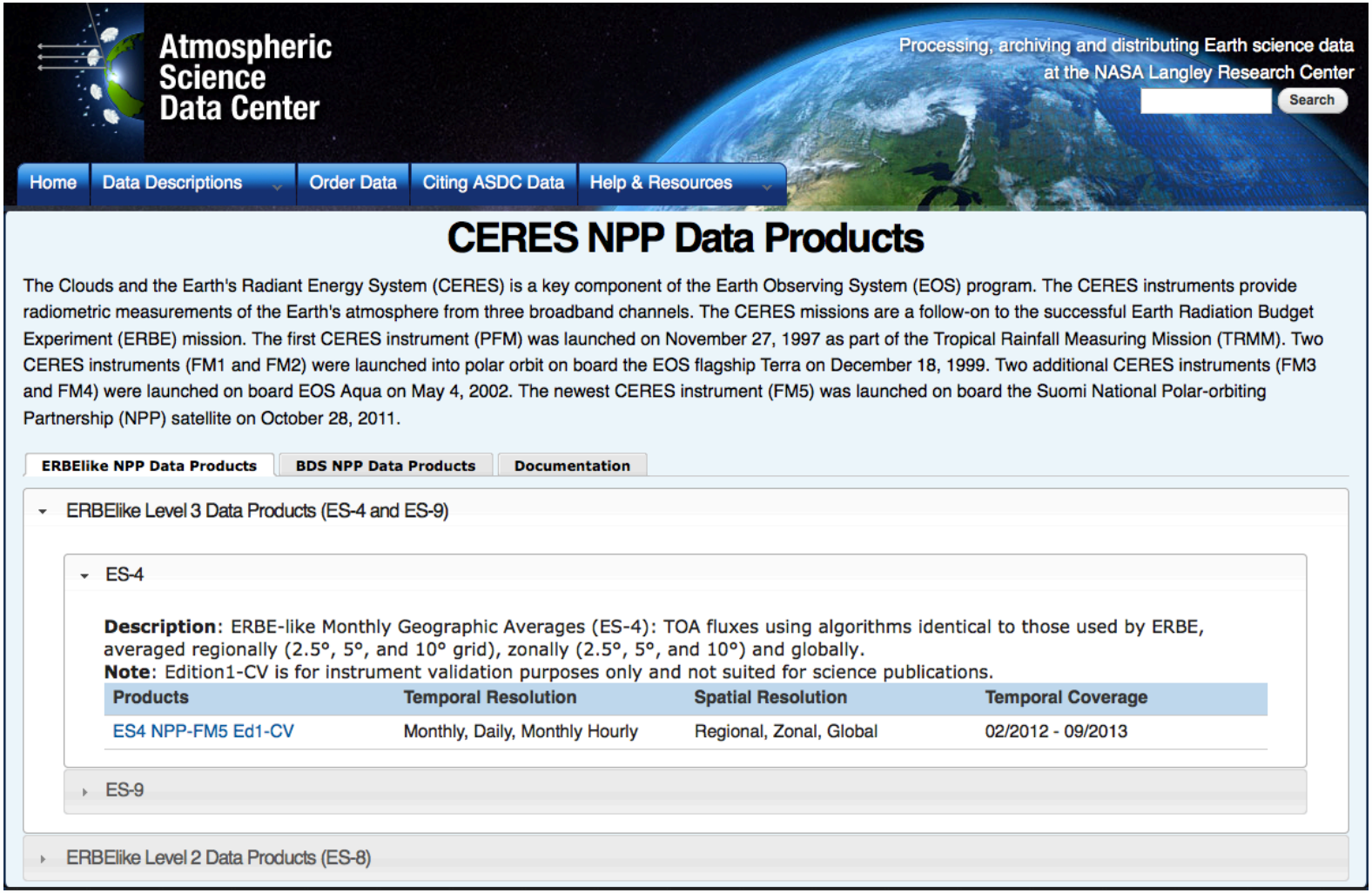
Added “Product Note” field and clearly labeled CERES subset tool with “netCDF”



http://eosweb.larc.nasa.gov

EOSWEB Updates

Added ES4 & ES9 to NPP Products page



Conclusion

- The ASDC continues to robustly support CERES ingest, archive, production, and distribution
- New alternative methods to file-level data access continue to be evaluated
  - “Get users the data the way they want it”
  - Potentially expand user community of CERES data
  - Cloud computing remains a possible model for future computing and data access needs
- Increased collaboration between ASDC and CERES team combined with new EOSWEB pages optimize CERES data discovery
  - Data info pages better guide users to appropriate product for user needs
  - New EOSWEB pages enable 4-Tier CERES data presentation

BACKUP CHARTS

LaRC Cloud Computing Scenarios

- ASDC Data Product Re-processing
  - Current approach: Buy extra hardware
  - Bursty behavior
  - High Data Throughput
- Individual Principal Investigator on-demand computing
  - Current approach: Buy small sets of hardware
  - Low duty cycle, infrequent usage
- New Mission Science Data Processing
  - Current approach: Buy dedicated or shared assets
  - Pre-launch mission processing runs out warranty
  - Compatibility with owned systems permits conversion when load warrants

LaRC Cloud Computing Scenarios

- Suborbital Missions
  - Current approach: Buy dedicated assets to take into field
  - Largely used only during field campaign (Bursty)
  - Remote Access is often difficult due to lack of connectivity
- Foreign National short-term Visitors and remote partners
  - Current approach: NIA or company provisioning and Duplicate Data
  - Irregular visitors, local hardware is often inadequate
  - Permit their sponsor to buy time Public Cloud without NASA participation
    - Permit NASA funded option depending on agreement with sponsor
  - NASA makes public data available to their cloud instance
  - Continue collaboration on non-NASA assets after they return home

ASDC Areas of Modernization (OLD)